REMARKS

Favorable consideration and allowance are respectfully requested for claims 1-3 in view of the following remarks.

The rejections of claims 1-3 under 35 USC §102(b) as anticipated by Xu et al. (U.S. Patent 5,973,44), Nolan et al. (US. Patent 5,780,101), Moy et al. (U.S. Patent 5,726,116), Tennent et al. (U.S. Patent 5,165,909) or Rodriguez et al. ("Catalytic ...Nanostructures") are respectfully traversed.

The claims all require graphite filaments provided in a particular spatial relationship on and in carbonized fibrous bodies which serve as a support for the filaments. The graphite filaments are arranged: (i) on the surfaces of the fibrous bodies; (ii) in the inside of each fibrous body; and (iii) in between adjacent fibrous bodies. Providing the graphite filaments in such an arrangement allows for a virtually limitless increase in the total number of graphite filaments. As the number of graphite filaments increases, the function of the fibrous carbon manifold assembly improves. In particular, a more uniform emission of field electrons, causing an increase in the quantity of absorbed or occluded gas, is achieved. Further, the electromagnetic absorbing (or shielding) properties are improved.

None of the cited references discloses an assembly where the graphite filaments are provided on all of (i) the surface of a carbonized fibrous body; (ii) the inside of a carbonized fibrous body and (iii) in between adjacent fibrous bodies, as

is presently claimed. Further, the references generally do not teach that carbonized fibrous bodies are the supports for the graphite filaments.

Xu et al. teaches an electron field emission device with a cold cathode device produced by (a) forming a thin metal catalyst film of iron, cobalt or nickel on a substrate, and (b) growing a carbon fiber on the thin metal catalyst film under heating at 300 - 1200°C in a gas environment containing hydrocarbon(see col. 7, line 31 to col. 9, line 23).

In this reference, the carbon fibers are formed on a thin metal catalyst film (see col. 7, line 46-50). Therefore, the teachings of the reference are different from the presently claimed invention. In the claimed invention, the carbon fibers are grown on the surfaces of the carbonized fibrous bodies, in the inside of each said fibrous bodies and in between adjacent fibrous bodies.

Accordingly, the reference fails to teach each and every element of the claimed invention. The electron field emission device described by this reference cannot have the functionality of the claimed invention where the number of graphite filament can be increased limitlessly as graphite filaments are grown on surfaces of each of fibrous bodies, in the inside of each of the fibrous bodies and in between adjacent fibrous bodies.

Nolan et al. (US 5,780,101) teaches carbon nanotubes grown on catalysts of Ni supported by silica-alumina under heating at 500°C in CO/CO2 gas (see col. 8, line 66 to col. 9, line 10). Because the carbon nanotubes of this reference are formed on catalysts supported by silica-alumina (see col. 9, line 1-9), the end result

is different from the presently-claimed invention. In the claimed invention, carbonized fibrous bodies provide the support of the carbon fibers. In particular, the carbon fibers are grown on the surfaces of carbonized fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Because the carbon nanotubes described by Nolan do not have this arrangement, they cannot have the functionality of the claimed invention where the number of graphite filament can be increased limitlessly. This is a result of the graphite filaments being grown on surfaces of the fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Moy et al. (US 5,726,116) teaches carbon fibrils grown on a metal catalyst of Co or Ni deposited on a support under heating at 400 - 850°C in carbon-containing gas (see col. 2, line 1 to 24). Carbon fibrils are formed on the metal catalyst deposited on the support of a metal oxide e.g., γ-alumina or magnesia (see col. 2, lines 8-17). Accordingly, the teachings of this reference are different from the presently claimed invention. In particular, carbonized fibrous bodies are used as a support in the presently claimed invention. Further, the carbon fibers of the presently claimed invention are grown on surfaces of carbonized fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Accordingly, the carbon fibrils of Moy cannot have the functionality of the claimed invention where the number of graphite filament can be increased limitlessly as a number of graphite filaments are grown on the surfaces of the

fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Tennent et al. (US 5,165,909) teaches that carbon fibrils are produced by contacting Fe catalysts deposited on Davison SMR-37-1534 SRA alumina powder with benzene-saturated hydrogen at 900°C (see col. 14, lines 23 to 38 and col. 12, line 6 to 10). Because the Fe catalysts of this reference are deposited on alumina (see col. 12, line 6 to 10), the arrangement is different than the presently claimed invention. In particular, carbonized fibrous bodies serve as a support in the claimed invention and the carbon fibers are grown on surfaces of the carbonized fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Accordingly, the carbon fibrils of Tennent cannot have the same functionality as the presently claimed invention where the number of graphite filament can be increased limitlessly as graphite filaments are grown on surfaces of the fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

The Rodriguez et al. reference teaches carbon nanofibers produced from the interaction of iron-copper bimetallic powders with a C2H4/H2 mixture at 600°C and from the interaction of iron powder and silica-supported iron particles with CO/H2 at 600°C (see page 2862, the column on the right). Because the carbon nanofibers of this reference are formed on iron-copper bimetallic powders, iron powder or silica-supported iron particles, they are different from the presently-

claimed invention. In particular, carbonized fibrous bodies serve as support in the presently-claimed invention and the carbon fibers are grown on surfaces of carbonized fibrous bodies, in the inside of each of the fibrous bodies and in between adjacent fibrous bodies.

Accordingly, the carbon nanofibers of Rodriguez cannot have the same functionality as the presently claimed invention where the number of graphite filament can be increased limitlessly as graphite filaments are grown on surfaces of the fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

The cited references all fail to teach an arrangement as is presently claimed. Reconsideration and withdrawal of these rejections are therefore respectfully requested.

The rejection of claims 1-3 under 35 USC §102(a) as anticipated by Penn State Patent (WO 01/98208) is respectfully traversed.

This reference teaches that carbonaceous articles are made by contacting ethylene gas with Fe-Cu catalyst on a quartz substrate at 570°C (see page 12, line 30 to page 13, line 18). Because these carbonaceous articles are formed on an Fe-Cu catalyst supported on a quartz substrate(see page 13, lines 1-3), they are different from the presently-claimed invention. In particular, carbonized fibrous bodies serve as supports in the presently-claimed invention and the carbon fibers

of the claimed invention are grown on the surfaces of these carbonized fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

Accordingly, the carbon nanofibers of the Penn State Patent cannot have the same functionality as the presently claimed invention where the number of graphite filament can be increased limitlessly as graphite filaments are grown on surfaces of the fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies.

The other references cited in the Office Action, including Chow et al. (U.S. Patent 6,582,673), Resasco et al. (U.S. Patent 6,413,487), Resasco et al. (U.S. Patent 6,333,016), Kambe et al. (U.S. Patent 6, 045, 769) and Exxon Research Patent (EP 56004) all fail to disclose or suggest carbonized fibrous bodies as a support of the catalyst. The references also do not teach carbon fibers grown on surfaces of the carbonized fibrous bodies, in the inside of the fibrous bodies and in between adjacent fibrous bodies. The references also do not teach that the number of graphite filament can be increased limitlessly when graphite filaments are grown on surfaces of the of fibrous bodies, in the inside of each of the fibrous bodies and in between adjacent ones of the fibrous bodies, respectively.

Accordingly, the present invention is directed to a different structure than that of these references.

CONCLUSION

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #100457.52481US).

Respectfully submitted,

October 3, 2005

Robert L. Grabarek
Registration No. 40,625
Christopher T. McWhinney
Registration No. 42,875

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
RLG:CTM:aw

398523